

CLAIMS

1. An information recording method of
recording information by irradiating a laser beam
5 onto a multilayer optical recording medium,
comprising:

a trial writing process of performing
trial writing of data on a trial writing area of the
optical recording medium with recording power of the
10 laser beam being gradually changed, and obtaining
optimal recording power based on a reproduced signal
of the data that are trial-written in advance of a
recording operation start; and

a recording power adjustment process of
15 adjusting the optimal recording power according to a
recording-start position, and starting the recording
operation using the adjusted optimal recording power.

2. The information recording method as
20 claimed in claim 1, wherein

the trial writing area on which the trial
writing process is performed is located at an inner
circumference of a target recording layer of the
optical recording medium, and

25 the recording power adjustment process

adjusts the optimal recording power according to the recording-start position when recording on the target recording layer that should be recorded on from an outer circumference to the inner
5 circumference.

3. The information recording method as claimed in claim 2, further comprising:

a running trial writing process of
10 obtaining the optimal recording power based on the reproduced signal of the data that are trial-written during the recording operation, wherein
the recording power adjustment process
adjusts the recording power after starting the
15 recording operation to the optimal recording power obtained by the running trial writing process.

4. The information recording method as claimed in claim 2, wherein the recording power
20 adjustment process adjusts the adjustment amount according to the recording-start position.

5. The information recording method as claimed in claim 4, wherein the recording power
25 adjustment process adjusts the adjustment amount

using a linear approximation with reference to a radial position of the recording-start position.

6. The information recording method as
5 claimed in claim 4, wherein the recording power adjustment process is carried out only when the recording-start position is located at a radial position greater than a predetermined radial position of the optical recording medium.

10

7. The information recording method as claimed in claim 1, wherein the recording power adjustment process adjusts the adjustment amount of the recording power according to a kind of the
15 optical recording medium.

8. The information recording method as claimed in claim 1, wherein the recording power adjustment process adjusts the adjustment amount of
20 the recording power with reference to an adjustment amount of the recording power beforehand stored in a non-volatile memory of an information recording apparatus.

25

9. The information recording method as

claimed in claim 1, wherein

the trial writing process performs trial writing on a trial writing area located at an inner circumference and a trial writing area located at an outer circumference of a target recording layer of the optical recording medium, and obtains optimal recording power of each trial writing area, and

the recording power adjustment process adjusts the optimal recording power obtained from the trial writing area of the inner circumference with reference to the optimal recording power obtained from the trial writing area of the outer circumference according to a recording-start position when recording on the target recording layer that should be recorded on from the outer circumference to the inner circumference.

10. The information recording method as claimed in claim 9, wherein the recording power adjustment process carries out linear approximation of the optimal recording power obtained from the trial writing area of the inner circumference and the optimal recording power obtained from the trial writing area of the outer circumference, and obtains the adjustment amount according to the radial

position of the recording-start position of the optical-recording medium.

11. The information recording method as
5 claimed in claim 9, wherein the recording power adjustment process is carried out only when the recording-start position is located in an area with a radial position greater than a predetermined radial position of the optical-recording medium, and
10 the optimal recording power is adjusted using a difference between the optimal recording power obtained from the trial writing area of the inner circumference and the optimal recording power obtained from the trial writing area of the outer
15 circumference.

12. The information recording method as claimed in claim 9, wherein:

the trial writing process is performed
20 only on the trial writing area located in the outer circumference of the target recording layer of the optical recording medium, and obtains the optimal recording power, when the recording-start position is at the outermost circumference position; and
25 the recording power adjustment process

starts the recording operation using the optimal recording power obtained at the trial writing process.

5 13. The information recording method as claimed in claim 1, wherein:

 the multilayer optical recording medium is an optical recording medium that has two or more recording layers that are recorded on by an opposite
10 track path (OTP) method based on the DVD+R specifications; and

 the trial writing process and the recording power adjustment process are carried out when a target recording layer should be recorded on
15 from the outer circumference to the inner circumference of the optical recording medium.

 14. An information recording apparatus, wherein information is recorded by irradiating a
20 laser beam onto a multilayer optical recording medium, comprising:

 a trial writing unit for performing trial writing of data on a trial writing area of the optical recording medium with recording power of the
25 laser beam being gradually changed, and obtaining

optimal recording power based on a reproduced signal of the data that are trial-written in advance of a recording operation start; and

a recording power adjustment unit for
5 adjusting the optimal recording power according to a recording-start position, and starting the recording operation using the adjusted optimal recording power.

15. The information recording apparatus as
10 claimed in claim 14, wherein

the trial writing area on which the trial writing unit performs trial writing is located at an inner circumference of a target recording layer of the optical recording medium, and

15 the recording power adjustment unit adjusts the optimal recording power according to the recording-start position when recording on the target recording layer that should be recorded on from an outer circumference to the inner
20 circumference.

16. The information recording apparatus as claimed in claim 15, further comprising:

a running trial writing unit for obtaining
25 the optimal recording power based on the reproduced

signal of the data that are trial-written during the recording operation, wherein

the recording power adjustment unit
adjusts the recording power after starting the
5 recording operation to the optimal recording power
obtained by the running trial writing unit.

17. The information recording apparatus as
claimed in claim 15, wherein the recording power
10 adjustment unit adjusts the adjustment amount
according to the recording-start position.

18. The information recording apparatus as
claimed in claim 17, wherein the recording power
15 adjustment unit adjusts the adjustment amount using
a linear approximation with reference to a radial
position of the recording-start position.

19. The information recording apparatus as
20 claimed in claim 17, wherein the recording power
adjustment unit adjusts the recording power only
when the recording-start position is located at a
radial position greater than a predetermined radial
position of the optical recording medium.

20. The information recording apparatus as
claimed in claim 14, wherein the recording power
adjustment unit adjusts the adjustment amount of the
recording power according to a kind of the optical
5 recording medium.

21. The information recording apparatus as
claimed in claim 14, wherein the recording power
adjustment unit adjusts the adjustment amount of the
10 recording power with reference to an adjustment
amount of the recording power beforehand stored in a
non-volatile memory of the information recording
apparatus.

15 22. The information recording apparatus as
claimed in claim 14, wherein

the trial writing unit performs trial
writing on a trial writing area located at an inner
circumference and a trial writing area located at an
20 outer circumference of a target recording layer of
the optical recording medium, and obtains optimal
recording power of each trial writing area, and
the recording power adjustment unit
adjusts the optimal recording power obtained from
25 the trial writing area of the inner circumference

with reference to the optimal recording power
obtained from the trial writing area of the outer
circumference according to a recording-start
position when recording on the target recording
5 layer that should be recorded on from the outer
circumference to the inner circumference.

23. The information recording apparatus as
claimed in claim 22, wherein the recording power
10 adjustment unit carries out linear approximation of
the optimal recording power obtained from the trial
writing area of the inner circumference and the
optimal recording power obtained from the trial
writing area of the outer circumference, and obtains
15 the adjustment amount according to the radial
position of the recording-start position of the
optical-recording medium.

24. The information recording apparatus as
20 claimed in claim 22, wherein the recording power
adjustment unit carries out recording power
adjustment only when the recording-start position is
located in an area with a radial position greater
than a predetermined radial position of the optical-
25 recording medium, and the optimal recording power is

adjusted using a difference between the optimal
recording power obtained from the trial writing area
of the inner circumference and the optimal recording
power obtained from the trial writing area of the
5 outer circumference.

25. The information recording apparatus as
claimed in claim 22, wherein:

the trial writing unit performs trial
10 writing only on the trial writing area located in
the outer circumference of the target recording
layer of the optical recording medium, and obtains
the optimal recording power, when the recording-
start position is at the outermost circumference
15 position; and

the recording power adjustment unit starts
the recording operation using the optimal recording
power obtained by the trial writing unit.

20 26. The information recording apparatus as
claimed in claim 14, wherein:

the multilayer optical recording medium is
an optical recording medium that has two or more
recording layers that are recorded on by an opposite
25 track path (OTP) method based on the DVD+R

specifications; and

the trial writing unit and the recording
power adjustment unit carry out respective functions
when a target recording layer should be recorded on
5 from the outer circumference to the inner
circumference of the optical recording medium.